

REMARKS

Applicants thank the Examiner for total consideration given the present application. Claims 1-10 are pending of which claims 1-3 are independent. Claims 3-6 are withdrawn as being directed to a non-elected invention. Claims 1 and 2 have been amended through this Reply. Upon careful review, one would conclude that no new matter has been added to the application via this amendment. Applicants respectfully request reconsideration of the rejected claims in light of the remarks presented herein, and earnestly seek timely allowance of all pending claims.

INTERVIEW SUMMARY

Applicants thank the Examiner for granting a Personal Interview with the Applicants' representative on January 13, 2010. During the Interview, Applicants' representative explained the claimed invention and the applicability of the applied prior art references. Applicants thank the Examiner for explaining his interpretation of the claimed elements and the applied prior art references.

35 U.S.C. § 103 REJECTION – Kobayashi, Riza, Izadpanah, Hong, Takushima

A. Claim 1 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kobayashi et al. (Japanese Patent Application Publication No. JP406276017)[hereinafter "Kobayashi"] in view of Riza (U.S. Patent No. 5,187,487)[hereinafter "Riza"]. Applicants respectfully traverse.

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Additionally, there must be a reason why one of ordinary skill in the art would modify the reference or combine reference teachings to obtain the invention. A patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. *KSR Int'l Co. v Teleflex Inc.*, 82 USPQ2d 1385 (U.S. 2007). There must be a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed

new invention does. *Id.* The Supreme Court of the United States has recently held that the "teaching, suggestion, motivation test" is a valid test for obviousness, albeit one which cannot be too rigidly applied. *Id.* Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *Id.*

In this instance, it is respectfully submitted that neither Kobayashi nor Riza, alone or in combination, teaches or suggests all claim limitations.

For example, claim 1 recites, *inter alia*, as follows:

a first signal light emitting unit for converting the first signal light into a signal light beam having a predetermined beam width to emit the signal light as a first signal light beam to space;

a second signal light emitting unit for converting the second signal light into a signal light beam having a predetermined beam width to emit the signal light as a second signal light beam to space;

a spatial optical modulator for phase-modulating the first and second signal light beams directly inputted to different areas of the spatial optical modulator to convert the resultant signal light beams into signal light beams having respective desired spatial phase distributions;

an optical multiplexer for converting the first and second signal light beams different in wavelength outputted from the spatial optical modulator into a single multiplex output signal light beam to travel through one and same coaxial optical path." (Emphasis added.)

The Examiner acknowledges that Kobayashi fails to teach or suggest "a spatial optical modulator" as claimed. Thus, the Examiner imports Riza to fulfill this deficiency of Kobayashi. More specifically, the Examiner relies on spatial light modulator 170 as disclosing the claimed spatial optical modulator.

It is respectfully submitted that Riza's spatial light modulator 170 does not phase-modulate a first and second signal light beams directly inputted to different areas of the spatial light modulator 170 to convert the resultant signal light beams into signal light beams having respective desired spatial phase distributions. Indeed, the entire reference is silent on a "first signal light emitting unit" and a "second signal light emitting unit" as claimed. Thus, in Riza, no

first and second signal light beams are directly inputted to different areas of the spatial light modulator to convert the resultant signal light beams into signal light beams having respective desired spatial phase distributions.

Although Riza discloses a spherical lens 142 centered between two light beam clusters emanating from an acousto-optic modulator (AOM) 140, the output beams are not directly inputted to the spatial light modulator 170. Rather, the spherical lens 142 converts the diverging wavefronts of the light beams in reference beam cluster b^{+1} and signal beam cluster b to collimated beam clusters. The reference beam cluster b^{+1} is inputted to a 45^0 prism 145 and the signal beam cluster b is inputted to a 90 degree polarization rotator 143. (See col. 7, line 55 – col. 8, line 25.) None of the reference beam cluster b^{+1} and the signal beam cluster b is directly inputted to the spatial modulator 170.

Thus, it is respectfully submitted that Riza's spatial light modulator 170 does not phase-modulate a first and second signal light beams directly inputted to different areas of the spatial light modulator 170 to convert the resultant signal light beams into signal light beams having respective desired spatial phase distributions.

In addition, it is respectfully submitted that the optical multiplexer 13 of Kobayashi does not *convert a first and second signal light beams different in wavelength outputted from a spatial optical modulator into a single multiplex output signal light beam to travel through one and same coaxial optical path.*

As previously submitted, Kobayashi is directed to a conventional antenna feeder circuit that is concerned with multi-beam formation in which directions of a plurality of beams are determined based on positions of masks, respectively. Kobayashi's antenna feeder circuit includes two or more laser light sources, an optical distributor, a spatial light modulation device, a laser beam modulator, and an optical multiplexer 13.

Contrary to the claimed invention, multiplexer 13 of Kobayashi multiplexes an optical signal generated with each modulator, and outputs to each radiating element correspondence of the array antenna. Then, a light/electric transducer changes the optical signal corresponding to each radiating element into an electrical signal, respectively, and extracts a high frequency signal

corresponding to each antenna beam, and supplies to each radiating element. (See paragraph [0018].) Indeed, Kobayashi clearly discloses that multiplexing is carried out and it is led to two or more optical transmission lines. (See paragraphs [0031] and [0033].) Thus, in Kobayashi, the multiplexer 13 outputs a plurality of light beams to travel through different optical paths.

The Examiner continues to rely on paragraph [0031] of Kobayashi as disclosing the above-identified claim feature. As previously indicated, in the optical control type microwave phase controller of Kobayashi, no more than one microwave phase wave surface can be formed by one spatial optical modulator, and therefore, the conventional phase controller cannot generate feed signals for an array antenna for radiating a plurality of microwave beams. Further, although Kobayashi discloses an antenna feeder circuit that is concerned with multi-beam formation, directions of a plurality of beams are determined based on positions of masks, respectively. As a result, Kobayashi's antenna feeder cannot direct a plurality of beams in a same direction or cannot superimpose. Therefore, in Kobayashi's antenna feeder circuit, directions of a plurality of beams are limited among the mutual beams. Accordingly, the optical multiplexer 13 of Kobayashi cannot convert a first and second signal light beams different in wavelength outputted from a spatial optical modulator into a single multiplex output signal light beam to travel through one and same coaxial optical path.

The claimed invention solves the above-noted problems associated with conventional optical control type microwave phase controller by providing an improved optical type microwave phase forming device which is capable of simultaneously forming a plurality of microwave phase surfaces using one spatial optical modulator. More specifically, the claimed invention can convert two lights into a single multiplex output light beam to travel through one and same coaxial optical path. (Emphasis added.)

Therefore, at least the above reasons, it is respectfully requested to withdraw the rejection of claim 1 based on Kobayashi and Riza.

B. Claim 2 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kobayashi and Riza, and further in view of Izadpanah et al. (U.S. Patent No. 7,020,396 B2)[hereinafter "Izadpanah"] and Hong et al. (U.S. Patent No. 4,965,603)[hereinafter "Hong"]. This rejection is respectfully traversed.

Amended claim 2 also recites, *inter alia*, as follows:

a first signal light emitting unit for converting the first signal light into a signal light beam having a predetermined beam width to emit the signal light as a first signal light beam to space;

a second signal light emitting unit for converting the second signal light into a signal light beam having a predetermined beam width to emit the signal light as a second signal light beam to space;

a spatial optical modulator intensity-modulates the first and second signal light beams directly inputted to the spatial optical modulator to convert the resultant signal light beams into signal light beams having respective desired spatial intensity distributions;

an optical multiplexer for converting the first and second signal light beams different in wavelength outputted from the spatial optical modulator into a single multiplex output signal light beam to travel through one and same coaxial optical path. (Emphasis added.)

As demonstrated above in great detail, neither Kobayashi nor Riza teaches the above-identified claim feature. Izadpanah and Hong have not been, and indeed cannot be, relied upon to fulfill the above-noted deficiency of Kobayashi and Riza.

Accordingly, it is respectfully requested to withdraw the rejection of claim 2 based on Kobayashi, Riza, Izadpanah, and Hong.

C. Claim 7 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kobayashi and Riza, as applied to claim 1 above, and further in view of Bouzid et al. (U.S. Patent No. 6,038,076)[hereinafter "Bouzid"]; Claim 8 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kobayashi and Riza, as applied to claim 1 above, and further in view of Takushima et al. (U.S. Patent No. 6,810,170 B2)[hereinafter "Takushima"]; Claim 9 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kobayashi, Riza, and Izadpanah, as applied to claim 2 above, and further in view of Takushima; and Claim 10 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kobayashi, Riza, and Izadpanah, as applied to claim 2 above, and further in view of Takushima. These rejections are respectfully traversed.

Claims 7 and 8 depend from claim 1. As demonstrated above in great detail, neither Kobayashi nor Riza teaches all claim elements of claim 1. Bouzid and Takushima have not been, and indeed cannot be, relied upon to fulfill the above-noted deficiency of Kobayashi and Riza.

Accordingly, it is respectfully requested to withdraw the rejection of claims 7 and 8.

Claims 9 and 10 depend from claim 2. As demonstrated above in great detail, none of Kobayashi, Riza, Izadpanah, and Hong teaches all claim elements of claim 2. Takushima has not been, and indeed cannot be, relied upon to fulfill the above-noted deficiency of Kobayashi, Riza, Izadpanah, and Hong.

Accordingly, it is respectfully requested to withdraw the rejection of claims 9 and 10.

CONCLUSION

All rejections raised in the Office Action having been addressed, it is respectfully submitted that the present application is in condition for allowance. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the

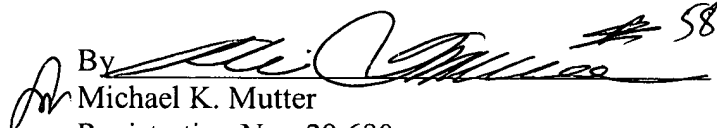
amendment of any claims does not necessarily signify concession of unpatentability of the claim prior to its amendment.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Ali M. Imam Reg. No. 58,755 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Dated: February 16, 2010

Respectfully submitted,

By  58,755
Michael K. Mutter
Registration No.: 29,680
BIRCH, STEWART, KOLASCH & BIRCH, LLP
8110 Gatehouse Road
Suite 100 East
P.O. Box 747
Falls Church, Virginia 22040-0747
(703) 205-8000
Attorney for Applicants